



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
24.11.2010 Bulletin 2010/47

(51) Int Cl.:
G01V 1/38 (2006.01)

(43) Date of publication A2:
02.12.2009 Bulletin 2009/49

(21) Application number: **09158177.7**

(22) Date of filing: **17.04.2009**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL
PT RO SE SI SK TR**

(30) Priority: **21.04.2008 US 148610**
24.03.2009 US 409694

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(54) **Methods for Controlling Towed Marine Sensor Array Geometry**

(57) A method for towing a streamer array includes moving a vessel along a body of water. Streamers (20) are towed by vessel. A relative position is determined at selected points along each streamer with respect to the vessel. At least one of the streamers (20) is deflected at at least one longitudinal position along the streamer in response to the determined positions to maintain the streamers in a selected geometry. The selected geometry is related to one of survey vessel heading, energy source trajectory, previously plotted sensor trajectory and a lateral separation related to distance from the towing vessel.

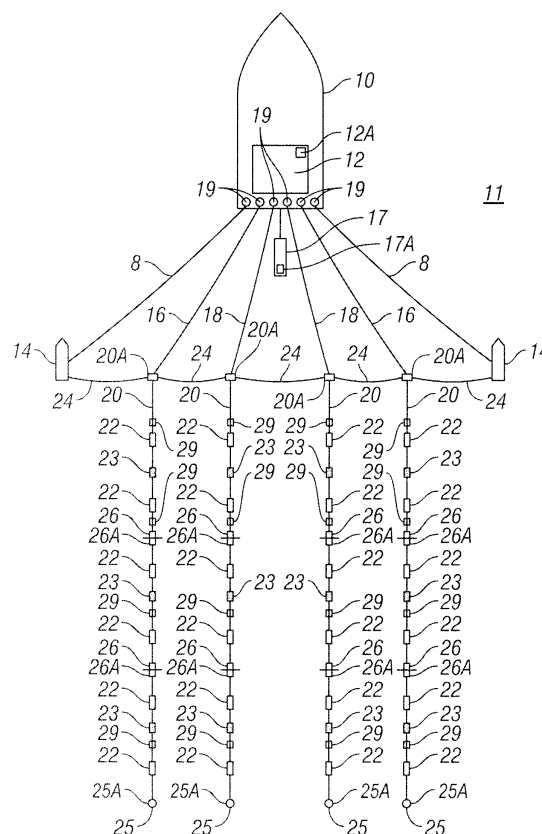


FIG. 1



EUROPEAN SEARCH REPORT

Application Number
EP 09 15 8177

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2004/060498 A1 (PETERSEN EGIL [JP] ET AL PEDERSEN EGIL [NO] ET AL) 1 April 2004 (2004-04-01) * paragraphs [0015], [0016], [0022], [0023], [0025], [0026], [0027], [0029], [0031] * * figures 1-3 *	1-9	INV. G01V1/38
X	US 2003/208320 A1 (ZAJAC MARK [US]) 6 November 2003 (2003-11-06) * paragraphs [0009] - [0011], [0016] - [0018], [0031], [0034], [0036], [0037], [0042] * * figures 1,2,3a *	1-9	
A	GB 2 441 411 A (SERCEL RECH CONST ELECT [FR]) 5 March 2008 (2008-03-05) * page 5, line 9 - line 29 * * page 8, line 22 - page 9, line 7 * * figure 1 *	1-9	
A	MUSSER J.A., BURNHAM M.: "Streamer Positioning and Spread Stabilization for 4 D Seismic" SEG, EXPANDED ABSTRACTS 25,6 (2006), 2006, pages 6-9, XP002589364 * page 1: "Impact of positioning errors..." * * page 8: "Effective Strategy ..." *	1-9	TECHNICAL FIELDS SEARCHED (IPC) G01V
X	US 6 498 768 B1 (GJESTRUM EINAR [NO] ET AL) 24 December 2002 (2002-12-24) * column 4, line 7 - line 42 * * figure 1 *	10	
X	US 4 798 156 A (LANGELAND JAN-AGE [NO] ET AL) 17 January 1989 (1989-01-17) * column 4, line 5 - line 10; claim 1 *	10	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 October 2010	Examiner Schneiderbauer, K
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.82 (P04C01)



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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number
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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-9

In addition to the common concept (see below) invention I defines method steps of determining the relative position at selected points and adapting the streamer shape in response to these determined positions.

2. claim: 10

In addition to the common concept (see below) invention II defines lateral deflecting forces which are applied at the selected positions.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-10-2010

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